DRIVER

MARCH 1974

- A VISIT TO THE CALIFORNIA HIGHWAY PATROL ACADEMY
- GETTING INTO MOTORCYCLING
- IT'S DARK OUT THERE

A VISIT TO THE CALIFORNIA

CALIFORNIA HIGHWAY PATROL
DRIVER IMPROVEMENT WORK SHEET

NAME_____ I.D._____ DATE_____
Last, First Initial

Area Rater I.D. Total Time Observed

RATING KEY 1 — Negligent 2 — Often Negligent 3 — Usually Complies 4 — Complies

A. PRE-DRIVING				
1. Is physically prepared to start shift.	1	2	3	4
2. Visually checks for damage or defects.	1	2	3	4
3. Checks wheels and tires.	1	2	3	4
4. Checks Form 33 for completeness and uncorrected defects.	1	2	3	4
5. Allows adequate time for engine warm up.	1	2	3	4
6. Checks brakes, lights, horn, siren and gauges.	1	2	3	4
7. Adjusts mirror and seat.	1	2	3	4
8. Secures loose articles within vehcile.	1	2	3	4
9. Fastens seat belt.	1	2	3	4
B. GENERAL DRIVING HABITS				
1. Backs cautiously.	1	2	3	4
2. Accelerates smoothly.	1	2	3	4
3. Stops smoothly.	1	2	3	4
4. Prepares for hazards at intersections.	1	2	3	4
5. Prepares for hazards near parked vehicles.	1	2	3	4
6. Makes turning, stopping intentions obvious.	1	2	3	4
7. Safe path and speed on turns.	1	2	3	4
8. Overtakes and passes with adequate clearance.	1	2	3	4
9. Spots distracted drivers.	1	2	3	4
10. Taps horn when in doubt.	1	2	3	4
11. Allows a "space cushion" when following.	1	2	3	4
12. Watches well ahead in traffic.	1	2	3	4
13. Doesn't "wander" within lane.	1	2	3	4
C. FREEWAY DRIVING				
1. Merges safely at proper speed.	1	2	3	4
2. Enters off ramps at safe speed.	1	2	3	4
3. Minimizes lane changing.	1	2	3	4
4. Avoids "blind spots."	1	2	3	4
5. Anticipates movements of overtaken vehicle.	1	2	3	4
6. Is constantly aware of traffic at rear and sides.	1	2	3	4
7. Maintains an "out" on both sides.	1	2	3	4
8. Provides an "in" for merging traffic.	1	2	3	4

DRIVER

SUPER INSTRUCTION, HOT CARS, EAGER CADETS

HIGHWAY PATROL ACADEMY

When it comes to driving, the California Highway Patrol knows where it's at. They have to. After all, the CHP operates a fleet of about two thousand in a sea of fourteen million registered California vehicles. This terrific exposure means it takes something "extra" to be able to successfully carry out their many important operations, and survive. This is where "EVOC" comes in.

EVOC is the Emergency Vehicle Operations Course, the most important segment of training for the new patrol officer. Here he has his first exposure to handling the big 450 Dodge Polara he will be driving on patrol through bad weather and darkness, and on high speed "Code 3" runs. It's quite an adjustment, especially for the young cadet whose only driving experience may have been in a VW or other lightweight small car.

He is exposed to concepts of driving that may be new to him such as corner apexes, weight transfer, understeer and oversteer, and he is carefully evaluated and rated on his driving performance (Fig. 1). Not all cadets can hack it, but those that do emerge from EVOC with a new depth of understanding and the capability to handle their cars effectively in many situations.

Although we can't cover all the important information presented at EVOC in one article, we can hit some of the high points that should be of particular interest to DRIVER readers.

SKID PAN

One of the first driving exercises the cadet takes on is handling a racing-slick-equipped patrol car on the academy's super-slippery oil and water skid pan. He spends many hours at it, which might seem odd to the casual observer watching the numerous slow speed spin-outs and skids. Like how does this relate to handling a car on dry pavement, the patrolman's primary field of battle?

Well, it does relate, and in a big way. The forces at work here are the same as encountered at highway speeds. The corrective steering (into the skid), and

continued

D. NIGHT DRIVING				
1. Drives within headlight visibility.	1	2	3	4
2. Maintains clean windshield and windows.	1	2	3	4
3. Lowers beam before required distance.	1	2	3	4
4. Avoids visual "fixation" on approaching lights.	1	2	3	4
5. Uses lights prior to complete darkness.	1	2	3	4
E. EMERGENCY OPERATION				
1. Drives at reasonable speeds.	1	2	3	4
2. Overtakes on left.	1	2	3	4
3. Uses siren properly.	1	2	3	4
4. Doesn't depend on siren audibility.	1	2	3	4
5. Uses headlights to advantage.	1	2	3	4
6. Slows prior to potentially hazardous areas.	1	2	3	4
F. STOPPING VIOLATORS				
1. Selects safe area for stop.	1	2	3	4
2. Positions his vehicle properly.	1	2	3	4
3. Sets emergency brake.	1	2	3	4
4. Cautious in opening door into traffic.	1	2	3	4
5. Uses warning lights properly.	1	2	3	4
6. Allows violator to leave first.	1	2	3	4
G. SPECIAL AREA CONDITIONS				
1. Slows prior to entering curves.	1	2	3	4
2. Drives within own lane on curves.	1	2	3	4
3. Properly controls skid on ice, snow, etc.	1	2	3	4
4. Proper speed in fog, rain, etc.	1	2	3	4
5. All windows defrosted before operation.	1	2	3	4
6. Other_____.	1	2	3	4
7. Other_____.	1	2	3	4
8. Other_____.	1	2	3	4
H. ATTITUDES				
1. Observes all traffic laws.	1	2	3	4
2. Courteous to pedestrians and other drivers.	1	2	3	4
3. Good posture and alert.	1	2	3	4
4. Stays calm in annoying situations.	1	2	3	4
5. Resists urge to "experiment" with horsepower.	1	2	3	4

COMMENTS:

What corrective action was taken to eliminate deficiences?

_____

_____

_____

Fig 1

DRIVER

THE TRAFFIC SAFETY MAGAZINE FOR THE MILITARY DRIVER

MARCH 1974

VOLUME 7 NUMBER 10

CONTENTS

FEATURES PAGE

A Visit to the California Highway Patrol Academy..... 1
It's Dark Out There 8
A Positive Approach to Safety..... 13
Getting Into It 14
It's Never Me 26

DEPARTMENTS

Double Clutch 2
The Back-Yard Mechanic..... 20
Backfire 26
Miss DRIVER.....Back Cover

DEPARTMENT OF THE AIR FORCE • HQ AIR FORCE INSPECTION AND SAFETY CENTER
Norton Air Force Base, California 92409

Lt Gen GERALD W. JOHNSON
The Inspector General, USAF

Maj Gen ERNEST T. CRAGG
Commander, Air Force Inspection and Safety Center

Brig Gen CHARLES E. YEAGER
Director of Aerospace Safety

PUBLISHED IN COOPERATION WITH THE DEPARTMENT OF THE ARMY AND THE DEPARTMENT OF THE NAVY

Dr. FRANCIS S. McGLADE
Director of Safety
United States Army

RADM W. S. NELSON
Commander,
Naval Safety Center

Col ALLEN J. DIEFENDORF
Chief, Safety Education Division

Capt TOBIAS van ROSSUM DAUM
Editor

VIRGINIA HENDRIX
Managing Editor

Sgt BOB KAYS
Technical Editor

DON KELLEHER
Art Director

MSgt BILL FOSTER
Staff Artist

MSgt MIKE KEEFE
Staff Photographer

ALICE MILKEY
Editorial Administration

AFRP 127-1

SUBSCRIPTION—DRIVER is available on subscription for $5.25 per year domestic; $1.35 additional for foreign mailing, 60c per copy, through the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Changes in subscription mailings should be sent to the above address. Single copies will be sold and back copies will be furnished when available. Use of funds for printing this publication has been approved by Headquarters, United States Air Force, Department of Defense, Washington, D.C. No payment can be made for manuscripts submitted for publication. Contributions are welcomed, as are comments and criticism. Address all correspondence to the Editor, DRIVER Magazine, AFISC/SEDD, Norton AFB CA 92409.

ATTENTION DEPT OF THE NAVY PERSONNEL: Address all queries concerning distribution to NAVSAFECEN, NAS, NORFOLK, VA 23511, Attn: Safety Education Dept. All other correspondence will be welcomed by the Editor.

The contents of this magazine are informative and should not be construed as regulations, technical orders, or directives unless stated. Address reprint requests, stating intended use of material, to the Editor. The Editor reserves the right to make any editorial changes in manuscripts which he believes will improve the material without altering the intended meaning.

THE EDITOR SPEAKS

DOUBLE CLUTCH

HOW ABOUT FUEL-SAVING ACCESSORIES?

Ever spend a lazy afternoon browsing through an automotive accessories catalog? If you've done it lately, you must have wondered about those gadgets and widgets that promise better gas mileage. Do they really work? Sad to say, the answer is no.

Technology is available right now to increase fuel economy as much as 30% on **future** cars. But most of this technology cannot be added on to the cars we're driving right now.

There are probably 50 gadgets claiming to increase your fuel economy by up to 10 miles per gallon. They range in price from $7 to as much as $75, and if the gasoline shortage gets worse we can expect to see many more hit the market. Some of them may actually lead to engine damage.

Take the common type that injects additional air or a fluid into the engine along with the normal air/fuel mixture dispensed by the carburetor. Burning a leaner mixture should save gas, but too-lean a mixture makes the car run poorly and use more gasoline, not less. Keep your carburetor adjusted properly and you'll be better off.

Another approach is to regulate the pressure of a car's fuel pump. You can expect more miles per gallon with that type of device only if the car was in bad mechanical condition to start with.

continued on page 13

NEXT MONTH
THE ELEVENTH MINUTE

nonuse of the brake are just as important in recovering on the skid pan as at high speed. So mastery of the skid pan gives the driver a big edge for skid recovery at highway speeds, as well as under wet or icy conditions.

On the skid pan the student discovers if he applies the brakes while turning, the front wheels will not steer. If he allows the back end of the car to get too far around, he cannot prevent it from completely spinning out. He finds if he travels too fast while turning, or makes sudden, abrupt steering changes, the vehicle will slide sideways off the pavement. The key to negotiating the turns is smooth and positive use of the throttle and steering.

The CHP points out that the only connection between a car and the road surface is four small patches of rubber, each about the size of a man's hand. Any change in the direction or velocity of a car is made by twisting these four rubber patches. A skid results when this twisting force exceeds the friction between the tire and the pavement. It can be set off by braking, acceleration, or steering inputs.

So the best way to avoid skids is to control these inputs, plus never drive on wet pavement with bald tires or slicks.

One of the biggest points to remember is to avoid braking in a skid, because you lose all directional control with the brakes locked. Sergeant Spencer, head EVOC instructor compared locked brakes in a skid to table legs on ice. In other words, visualize a table that has been pushed out on an ice surface. It will spin and continue in the direction it was pushed until it hits an object. The same goes for a car with locked brakes.

To recover from a rear end skid you must ease up gently from the accelerator, stay off the brakes, and countersteer in the direction the rear of the car is skidding (Fig. 2). Then straighten the wheels as soon as you feel the rear end starting to return straight ahead. You have to react quickly and correctly or the vehicle may swing into a skid on the side opposite the first skid. If this happens, you have to be ready to countersteer for this skid also.

Skid recovery is not difficult to describe, but to get a "feel" for it is another matter. One CHP officer told DRIVER that skid-pan training and testing should be a requirement for licensing, because it is so essential for

continued

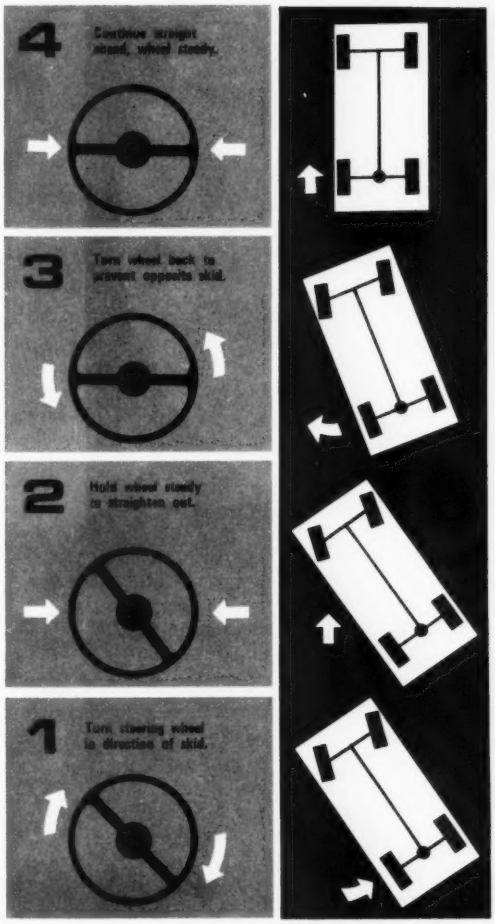


Diagram reprinted from "Driver Education and Traffic Safety," Center for Safety Education, New York University (Prentice-Hall).

Fig. 2
How to correct a skid in four steps.

Skid pan training is an essential part of any comprehensive driver training program. Don't let yourself be caught off guard by a skid, and then do nothing or the wrong thing. Even if you haven't had the training, learn the basics of skid recovery—some day it will pay off.

continued

A VISIT TO THE CALIFORNIA HIGHWAY PATROL ACADEMY

highway survival. But until that day, DRIVER readers who have access to supervised skid pan training would be smart to get ahead of the game.

HIGH-SPEED COURSE

After the skid pan and extensive classroom discussion about the forces involved in cornering, the student is exposed to the high-speed course.

Strapped into a special roll-bar-equipped patrol car (see photo), the student is driven for several slow-speed runs through the course by an instructor. Then comes the high-speed run. Everything seems okay until the first corner is approached at a healthy clip. In a semi-panic the student suddenly realizes that if he were driving there would be no way he could negotiate the corner.

As they emerge from the last "S" turn the student usually feels a bit of awe and a lot of respect for his instructor who has demonstrated a masterful performance of control of a powerful car on a track.

High-speed practice driving of this nature is limited to the track. Here the student can build his skill under the close supervision of the excellent EVOC instructors. Risk is minimized because of the superior condition of the cars, the way they are equipped, and the standby emergency gear.

But many principles applied in driving this course are applicable to normal highway driving, particularly in cornering. Although lanes on a highway are narrower than on a track, the idea is to make best use of all the roadway available.

Cadets are taught to never enter a corner at maximum speed because the front end will wash, understeer (resist turning), or mush. You should plan your course through the corner before you enter, and position the vehicle accordingly. Then enter at or below the speed indicated for the curve, establish a straight line, and accelerate smoothly as you leave the turn.

In selecting position for a turn, the driver is merely attempting to drive the car through on the straightest line possible. This course is a line of least resistance or stress to the vehicle. The curve is approached from the high side or top of the turn. The path of travel should bring the vehicle to the apex or inside of the turn just prior to that time when the vehicle is pointed out of the turn.

According to the CHP, when a driver enters a turn too fast he defeats himself, and often all he can manage to do is keep the car on the roadway. Throttle application at this point will cause additional problems because the rear wheels push ONLY IN THE DIRECTION THEY ARE HEADING, so chances are the car will leave the turn on the outside.

Hitting the brakes at this point is equally bad. If the brakes are locked, the car will slide straight off the road. So if you enter a corner too fast, the CHP recommends as a general rule of thumb that you stay away from both throttle and brakes.

There's a problem that crops up quite frequently on this track in Sacramento —small animals trotting across the roadway. What the CHP recommends is a good idea for all drivers to follow in this situation. Don't swerve for the animals on the highway. Instead, get off the gas; if they are traveling in a straight line they will move away. In no case should you stare at the animal(s) because you might hit something farther down the road.

COMMENTARY DRIVING AND ON THE BEAT

It's not enough to be highly skilled in controlling your car on the skid pan and academy track. This is not so difficult to attain if you can apply the important techniques and principles governing the control of your car. What's hard is when you move out into the real world of traffic. Here it's a different story. EVOC instructors caution the cadets that they will be driving among all types of drivers, all ages, in various emotional conditions, and in varying degrees of sobriety. Some have little or no regard for driving laws and their actions are hard to predict.

One of the methods the academy uses to prepare its cadets for the real world experience is through commentary driving. Here the cadet is required to talk as he drives, describing all he sees and thinks. It's something all drivers should try and it can become an enjoyable and educational family game on trips that promotes recognition of potential hazards.

DRIVER accompanied a student instructor team during commentary driving, and in addition went out on patrol with Officer Norm Main. We picked up a lot of valuable tips and observations that may be of interest and use to our readers. Here they are:

■ When pulled up behind someone in traffic, leave enough space so you can see his vehicle's tires. This allows room enough to pull around his car if he becomes stalled, and allows a space cushion to absorb the shock if you are rear ended.

continued

The CHP takes things seriously, especially when it comes to high-speed driving. Perhaps this accounts for the academy's excellent safety record. Only low mileage, specially equipped patrol cars are used on the high-speed course. The Polaras are equipped with roll bar, special wheels and axles, and full safety harnesses. Driver and instructor are belted securely and wear a helmet. Note strap to secure door in the event of a roll over.

Mechanic Fred Moeckly monitors each vehicle carefully as it covers the high-speed course. He is in radio contact with each driver from his well equipped pickup truck, which contains fire extinguishers, first-aid kit, a winch, and tools.

Note the lean of this car on the high-speed course. When a vehicle is turned sharply energy is stored in the chassis through displacement of the springs. The driver must anticipate the release of this energy. If he is not aware of its existence, he may over-correct and lose control, or cause a skid.

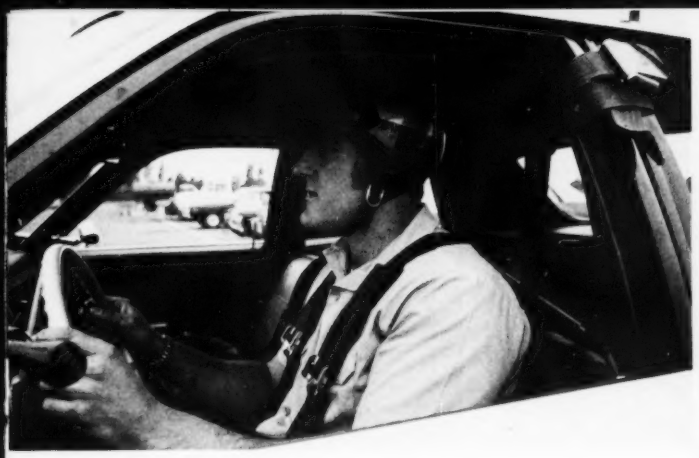
The idea is to drive a straight line through the corners . . .

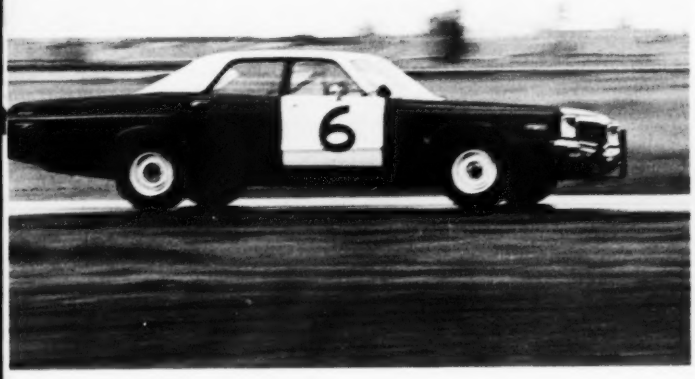
Here's what can happen if you don't countersteer in time.

Crrunnch! Cadets are given a graphic example of what can happen when a car door is opened directly in the path of an oncoming vehicle traveling in the same direction as the parked vehicle. The driver of the striking vehicle should have anticipated a hazard while approaching the parked patrol car. The driver of the parked vehicle should have checked his mirrors, AND looked over his shoulder before opening the door.

During the high-speed runs, Fred periodically calls in the cars and checks for lug nut tightness, evenness of tire pressure, and cracks in the wheel rims. Uneven tire pressures result in poor handling characteristics. Fred says he frequently finds lug nuts are loose after about 20 laps.

Here's why the high-speed patrol cars are equipped with white rims, and run without hub caps. Cracked rims were a real problem until the Academy switched to a more rugged rig. Cracks are easily detected on white rims, and usually occur around the lug nuts, in addition to where shown here (arrow).




6

6

HIGHWAY PATROL

8

continued

A VISIT TO THE CALIFORNIA HIGHWAY PATROL ACADEMY

■ When waiting to make a turn across oncoming traffic, keep your wheels STRAIGHT AHEAD (photo right). If you crank the wheels to one side in preparation for the turn *before* you commence the turn, you are wide open for trouble. A rear ender would shove you right into the stream of opposing traffic.

■ At an intersection, the traffic coming from the left has the first shot at hitting you broadside so always look to the left first.

■ In a right-of-way situation with a female driver, it is always best to yield. Social practices have led her to expect this of male drivers.

■ It's important to have a good feel for the stopping distance of your vehicle at various speeds. At 50 mph the stopping distance is about 183 feet. So if you are trying to avoid hitting an object within this distance and lock up the brakes you will plow right through it.

But you can avoid the collision by *steering around the object*. At this speed you can displace your car about 14 feet to either side, a much more promising proposition.

■ It is extremely dangerous to change a tire with your back end hanging out in traffic, or to stand between cars parked along the highway.

■ About half of the new cars have headlights out of alignment. So don't assume that yours are okay because your car is new. Have them checked.

■ Avoid driving behind trucks, buses, or campers that hamper your visibility. This limits your reaction and braking distances to just a few feet, and forces you to depend on the other guy's reactions.

■ If you have a blowout stay off the brakes and don't exert a sudden hard jerk on the wheel. Continue bearing in the same direction the blowout pulls you, traffic permitting. Alert other drivers with hand signals, and steer the car off the roadway at the first safe opportunity. Don't try to stop as quickly as possible to "save the tire." It's already ruined.

■ If you are in an accident in which your vehicle rolls over, don't brace yourself against the roof or other structures. Grab hold of the shoulder belt across your chest and hold on to yourself as much as possible. Otherwise you most likely will break bones and ligaments.

■ With the energy crisis, the CHP has found a lot of drivers who drive below the speed limit, yet remain in the outside lane. Keep this lane free for passing and emergency vehicles.

■ Always look around before you make a lane change. The mirrors leave a blind spot.

■ Drunk drivers are around at *all* hours of the day and night. It's important for the average driver to realize this and to always be alert for unusual actions by other drivers. When you approach an intersection where a driver is waiting, the potential hazards are: (1) he may not see you, (2) he may be drunk, (3) he may think he can make it across before you.

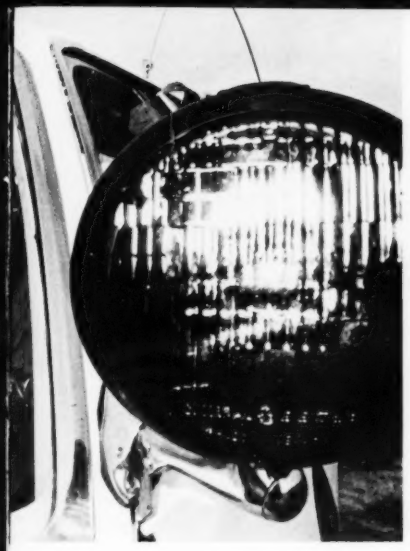
During our half-day patrol with Officer Main, we made a number of stops including several for speeding, bald tires, cracked windshields, excessive exhaust smoking, missing outside mirror, and no license plates. But the majority of stops were made for inoperative taillights.

As Officer Main pointed out, these type of discrepancies, along with sloppy driving techniques, alert the patrolman that something may be wrong with the driver's condition or attitudes. Drivers who "grease" through stop signs or who stop on freeway on-ramps are of special interest to enforcement officials because they are the ones who cause accidents.

It would be a good idea for us all to appraise our vehicles and driving practices with a thought to how they might be looked at by a highway patrolman. After all, he is watching, and he knows where it's at when it comes to what's important in surviving on the highway.

A good tip from Officer Norm Main—keep your car's wheels straight until you are actually making the turn. Many is the motorist who has been rear ended with his wheels to one side. The resulting shove into opposing traffic is bad news!

"Code 3" runs are often a hair-raising experience for the patrolman. Not only do motorists sometimes ignore their presense, but often stop directly in front of the emergency vehicle. When running Code 3, the patrolman is on his way to a location where he is urgently needed. A life may hang in the balance, so watch your rear view mirror, and give way to emergency vehicles.



It's a big day when badges are passed out at the academy. The academy trains about 400 patrolmen a year. It's estimated that the patrolman's driving experience here exposes him to more decision making situations in the first four hours than he will experience in his first four years on the job.

SOME IMPORTANT TERMS

KINETIC ENERGY

The energy a body has because of its motion. A 4,000-pound vehicle traveling at 130 mph develops over 2,000,000-foot-pounds of energy. If this energy could be so channeled, it could lift a 2,000,000-pound building one foot in the air.

In the formula for kinetic energy, velocity in feet per second is squared. This has direct and important meaning to each driver. As speed doubles, kinetic energy and braking distance increase by four times. As speed triples, they increase nine times.

POTENTIAL ENERGY

A vehicle simply parked on a hill with its parking brake on has potential energy in its mass by its very position. If the brake is released, the potential energy is likewise released and becomes kinetic.

A vehicle in motion while in a turn has potential energy because of displacement. The compression of springs on one side and the stretching of springs on the other create an energy which when direction of turn is reversed, releases kinetic energy which has a direct effect on the vehicle. A vehicle negotiating an "S" turn or one swerving to miss an obstacle illustrates potential energy graphically. The energy released by the displacement of the vehicle can cause loss of control, throwing the rear of the vehicle to the outside of the turn. This energy can be controlled by throttle and steering.

ROLLING FRICTION

A vehicle steers only by rolling friction. If the front wheels are not rotating, it is not possible to steer.

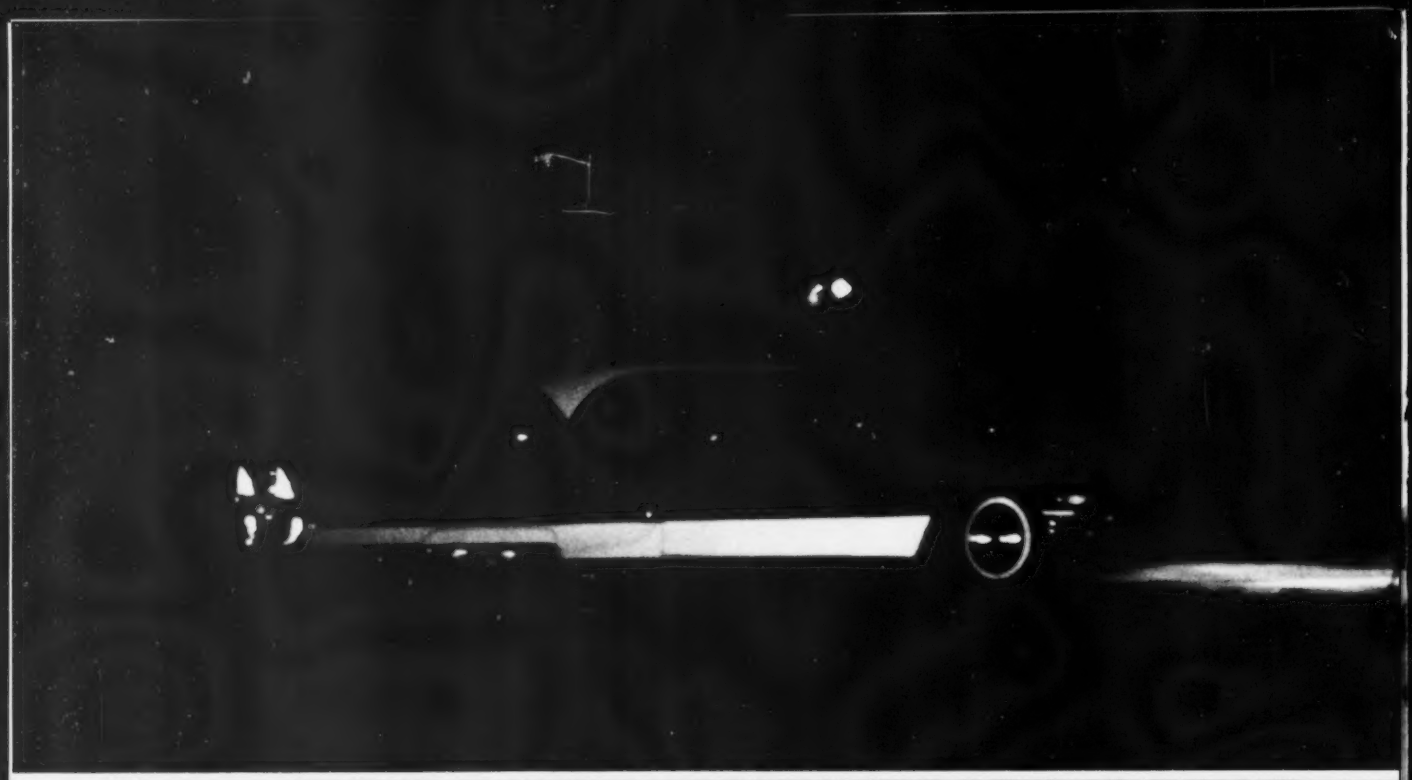
A lot of drivers don't realize this and it can trip them up in the following manner. Say a driver enters a corner too fast, realizes his mistake and slams on the brakes, locking up all four wheels and causing the car to slide. He will slow down and may be traveling only 25 mph when he reaches the curve, but there's a problem. The vehicle will be sliding straight ahead, even though the wheels are turned in the direction the driver wishes to go. It will continue to skid in a straight line and off the road until it stops—or until the driver eases off the brakes and permits the front wheels to rotate.

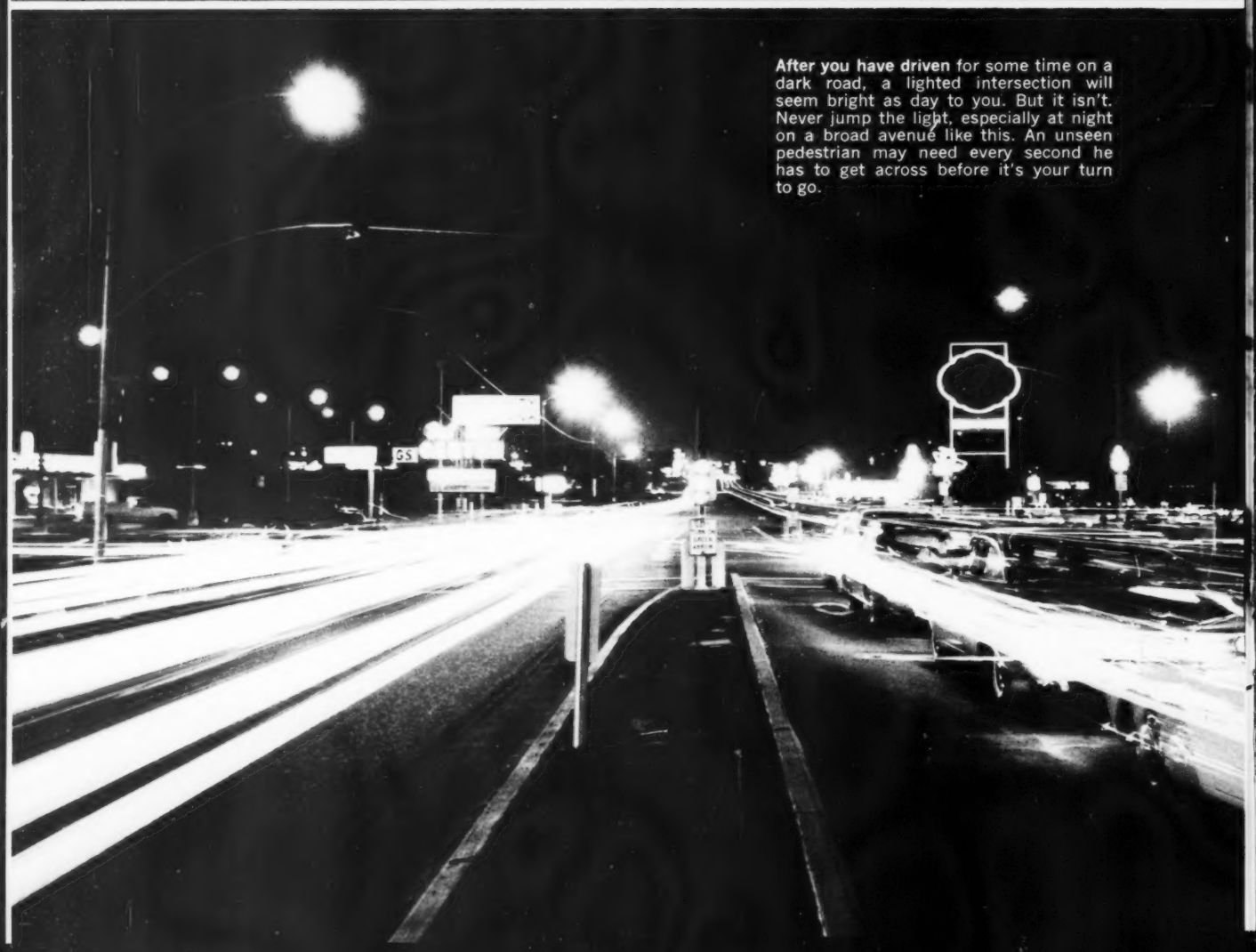
OVERSTEER

A vehicle has a tendency to tighten up its turning radius. This often happens when the maximum limit of cohesion has been exceeded, and the back end of the car breaks loose first and begins to move toward the outside of the turn. This type of oversteer can be caused by sudden application or withdrawal of the throttle during a turn or by sudden, rough movements during a turn.

UNDERSTEER

Most U.S. cars are designed to produce understeer. This means the vehicle is designed so it tends to maintain a straight line. If something disturbs its path, it has a tendency to straighten itself out and return to the original path of travel.





After you have driven for some time on a dark road, a lighted intersection will seem bright as day to you. But it isn't. Never jump the light, especially at night on a broad avenue like this. An unseen pedestrian may need every second he has to get across before it's your turn to go.

There's only a third the usual number of cars on the road, but you have more than twice the chance of having a bad accident. Why? Because

it's DARK out there

If you're one of those people who starts driving cross-country about 10:00 p.m. when you could just as well leave right after breakfast, then you must like night driving. So it may surprise you to hear that a lot of people really hate it.

Partly this is because of differing personalities. We all know "morning" people who think it's kicks to jog a couple of miles through the mists of dawn. They are considered a little weird by the "night" people who won't even play tennis until the electric lights come on at the courts. But there are other important reasons why some people like night driving and some don't.

This article is for all kinds of people. If you really don't like to drive at night, you can become a more relaxed driver by following these tips. And if you already prefer to drive at night, you can learn how to protect yourself from those other drivers out there who are nervous about the whole thing and can get you into trouble.

Glare blinds everyone temporarily. Recovery times vary; some people may be blind for several hundred feet after passing an oncoming car. But even so, there are things you can do to help your eyes.

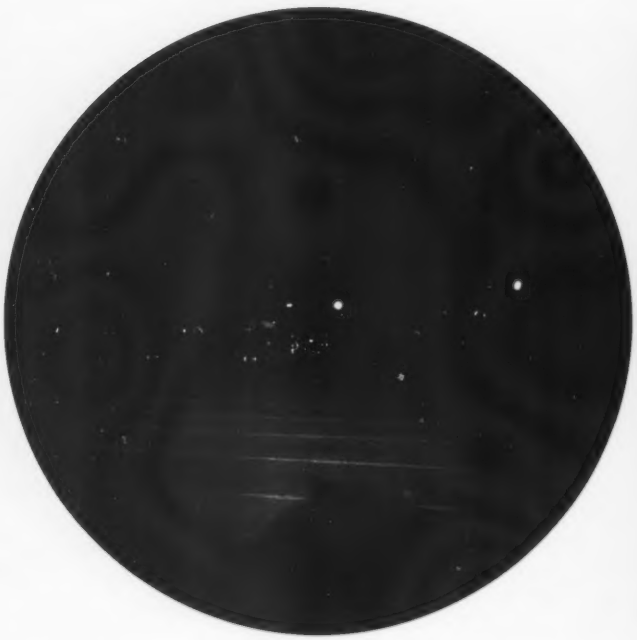
VISION

The single thing that's most important for driving—especially night driving—is vision. Not everybody sees with the same degree of perception

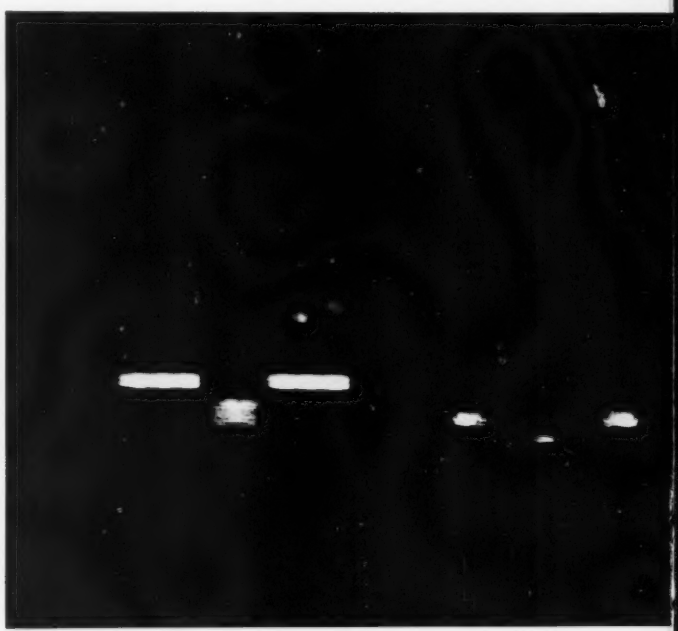
continued

The three people out there (can you make them out?) are 105 feet away—the stopping distance of our car if we're traveling 35 mph. Notice how important clothing is. The man in the white trousers and striped jacket is partly visible. The highly visible man is wearing reflective tape on his jacket ("H" on the front, strips on the sleeves). Which one would you rather be?

Here are the same people 225 feet away—our stopping distance at 55 mph. From this distance we have lost the man in the white trousers and striped jacket, too. Only the pedestrian with the reflective tape is still clearly visible. If you're a motorcycle rider, these pictures should impress you with the need to wear a high-visibility jacket and reflective helmet when you're on the road at night.



If your headlights are aimed too high or too low, you'll miss a lot—like this black car that doesn't show up very well at night anyway. Poorly adjusted lights are one of the most frequent discrepancies turned up by spot-check auto inspectors. Dirt can cut illumination in half. If you're driving at night, clean your headlamps every time you clean the windshield. Remember, heavy loads affect headlight aim, too.

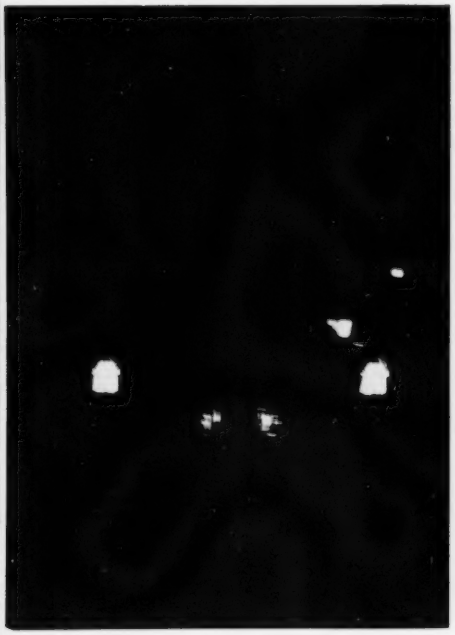


This photo shows why you should increase your following distance at night. Your depth perception isn't nearly as good as it is in the daytime when sizes, shapes, colors, shadows and relationships to the general background aid us in judging distance. These three cars are the same distance ahead of us but the small car with tinier taillights looks farther away. It takes longer at night to judge distance.

and accuracy. At night our seeing ability diminishes, naturally, and so does our ability to sort out different objects and judge distance.

These differences become greater as we get older and the ability of our eyes to see, adjust and recover from such things as headlight glare is reduced. The driver of 30 requires more light to see the same thing at night that a 20-year-old can see, and by the time he's 50 he may need at least twice as much light. These changes in the eyes come about gradually and often we aren't aware of them and fail to make allowances.

To some extent, you can improve your nighttime seeing ability. Take two men 21 years old, each with 20/20 vision. They see equally well in good light. But there's more to it in the dark—like peripheral vision, dark-adaptation ability, and glare resistance. One may dislike night driving and not even realize it's because he can't see well in reduced light. But he can do things to help himself.



PERIPHERAL VISION

Your ability to see to the sides while aiming your eyes straight ahead is known as peripheral vision. While this vision sees nothing very clearly, it's tremendously important because it picks up lights, movement, and anything that's lighter or darker than the background. Some people lack good peripheral vision either because they never learned to use it or because of a physical defect.

Experiment with your own peripheral vision. If you find you're not noticing the lights of a cross-traffic car as soon as you should, train yourself to move your head and eyes continuously so that your good "center" vision isn't tunneled straight ahead.

This constant sweeping movement of the eyes can help you distinguish objects. By focusing a little to the side of an object rather than directly on it, some people get a clearer impression.

DARK ADAPTATION

The abiliy of your eyes to adapt quickly to darkness or light also is important to nighttime driving. No matter how sharp your eyes are, it's going to take them a while to adjust to light-intensity change. You experience this every time you walk from bright sunlight into a darkened theatre or restaurant.

The adjustment from dark to light is uncomfortable for a few seconds, but it is quick. The complete adjustment from light to darkness, however, may take as much as half an hour.

You can help yourself by wearing sunglasses. If you spend a day in bright sunshine—at the beach or in the snow—you are wise to wear sunglasses during the daylight hours. The glasses will help your eyes preserve their supply of "visual purple," a retinal chemical that helps them adapt to the dark. A day of exposure to much sun and glare without sunglasses can drastically cut ability to see at night.

Sunglasses should never be worn for night driving, but it can be helpful to put them on when you pull into a brightly lighted service station or refreshment area. When the eyes are shielded from the artificial glare, they seem to adjust more quickly to the darkness back on the road. Be sure to take them off before you start out again. You may find it helpful to dim your dash lights so that your eyes aren't constantly reacting to that light.

GLARE RESISTANCE

Hand in hand with dark adaptation is resistance to glare. This refers to how quickly you can see again after being exposed to the headlights of an oncoming car. It's likely you'll be driving blind for 50 to 75 feet after the car passes you—depending on your speed.

One out of seven people between 20 and 29 has below-average resistance to glare. They may be blind for several hundred feet after passing an oncoming car.

If you are particularly bothered by glare, there are things you can do to help yourself. Keep the inside of your windshield as clean as the outside. People sometimes forget how filmy the inside glass can become—especially if smokers use the car.

If you wear corrective lenses, keep them clean too. (And clean your headlights at each gas stop. Headlights may seem bright when they're coming at you on the road, but try reading a newspaper by them sometime and see how weak they really are. You can't afford to let dirt rob you of any of their light.)

When you are faced with a severe glare situation (a driver who refuses to lower his high beams or a car with misaimed headlights), slow down and avoid staring directly at the approaching lights. Resist the temptation to get even by putting your high beams on. The usual advice is to guide yourself by keeping your eyes on the right edge of the road or on the oil-drip strip down the center of your lane. But some pros now say that instead you should keep your eyes moving from the edge of the roadway back to the center of your lane, and then to a point somewhere in the oncoming car's lane. By doing this you may be able to drive a better course, see anything that might pop into your lane,

continued

If you must stop at night for an emergency, turn on the four-way flashers if the car has them and set up a flare as this driver has. You should always carry a couple of flares. Of course, it is safer to get the car completely off the pavement if you possibly can.

and at the same time spot potential hazards on his side of the street.

DRIVING TECHNIQUES

The two most important driving techniques affecting safety at night involve speed and following distance. Even with the finest vision in the world, you can't see beyond your headlights. If you drive so fast that you can't stop within the area they illuminate, you are moving toward a completely blind, no-stop crash zone. Reduce your speed so that you aren't over-driving your headlights. Some otherwise careful drivers don't reduce their speed at night when they are on familiar streets and roads around home. Don't fall into that trap. Traffic is a changing scene. Nothing is exactly as you saw it earlier in the day, and you can't afford to assume that it is.

You should increase following distances at night because it is almost impossible to judge how fast the vehicle ahead is moving just by observing the taillights. It takes time and other clues to assure yourself of his speed.

Whenever possible, maintain an open space around you as far from other traffic as possible. You should do this in daytime too, but it's even more important at night because there are more drivers of questionable ability on the road with you—drunk drivers, drivers with night vision problems, tired drivers and drivers who refuse to make allowances and insist on driving at night the way they drive in the daytime.

If you face an emergency at night on the open highway, pull off the road as far as you can. If your car has four-way flashers, activate them unless you are a considerable distance from the road. If you are well off the road it may be better to leave all your lights off rather than run the risk of someone "following your lights" right off the road and crashing into you.

If you don't have flashers and you're parked close to the road's edge, put your parking lights and interior lights on and, if you possibly can, get completely away from the car. If you have flares (and you should have at least two) or reflective triangles, set one up at the side of the road about 300 feet behind the car.

Put your night driving techniques into effect as soon as the sun goes down. Probably the most difficult time to drive is at twilight. Your eyes are struggling to adapt to the dimness, but your car's headlights aren't powerful enough to cast any useful light.

All of these things we've been discussing are important in good weather. In bad weather they're even more so. Your night vision problems are compounded by rain. You not only have to strain to see through the darkness but you have to fight the dazzling wet reflections of headlights, street lights and illuminated signs. It's a good practice to wash the windshield before you start out on a rainy night. And give the wiper blades a quick going over with a paper towel. The rain really won't clean the windshield, and clean wiper blades will reduce the smearing of road film.

There's one final hazard of nighttime driving and that involves the mental state of the driver who's alone. There he is, snug in the comfortable cocoon of the car, the engine humming sweetly, the radio gently masking the outside noise. The darkness hides the distractions of the daytime world. And first thing you know, he's off in a dream, eyes fixed straight ahead on the pavement at the end of the headlight beams, his mind completely heedless of all those hazards that are really out there in the dark.

Enjoy your nighttime driving. But not that much.

A POSITIVE APPROACH TO SAFETY

That's what they have at Fort Bragg

Lectures and presentations on safe driving are routinely given to servicemen departing their installations on holiday leave. But more often than not, they consist of highway death statistics and grim accident photos. The safety people at Fort Bragg, however, have a different approach to promoting safe driving, typified by their Christmas program.

Instead of the bromidic scare tactic routine, they put on a show. It's a lively form of musical comedy revue involving singers and dancers from the neighborhood community as well as military personnel and dependents. The program is a celebration of the joys of living with an overall safety message in song.

The Christmas show's format was an attention-getter—pretty girls, lively music and a lot of dancing. The 82nd Airborne Division Band and Chorus provided the musical support which consisted of songs taken from the famous production "Godspell." Choreography was arranged by an instructor from a local dance school. Sponsored by the Corps G-1 Safety Division and the Recreational Services, the revue had a cast of 40. It was witnessed by approximately 11,000 soldiers prior to scattering to the winds on holiday leave.

John F. Sticht, Corps G-1 Safety Director, commented the program was to entertain the troops while at the same time raising people's awareness of the increased hazards due to the holiday. He said past audience response along with letters received indicate the message is getting across.

To the people involved with this program at Fort Bragg, DRIVER offers hearty congratulations. We feel this is the right approach to safety. You Safety People out there—are you listening?

continued from page 2

DOUBLE CLUTCH

A raft of "electronic" devices are advertised to improve fuel economy. Most common is the electronic ignition. This one is convincing because we all know Chrysler has electronic ignition systems on its 1974 models. But Chrysler doesn't claim a fuel-economy improvement for the device. They say it prolongs the life of the car's engine-electrical system. Experts say if a car is in need of a tune-up, an electronic ignition system may permit the fouled plugs to fire when a conventional ignition won't. That does mean better fuel economy. But in a properly tuned vehicle, the electronic system provides no fuel economy advantage. The same things can be said for the other electrical gadgets such as spark intensifiers and special spark plugs.

Just for fun, next time you're looking at ads for some of these economy wonders, add up the claims and see what kind of mileage you should expect if you put **all** of them on your car. We read about an engineer who did that and found his car should be giving him 200 miles from a gallon of gasoline while developing about 600 horsepower!

The way to improve your gas mileage is to keep your car properly tuned, the tires correctly inflated, and your driving smooth. But if you dig gadgets, why not spend $5 on a vacuum gauge that not only will help you get better mileage, but tells you something about your engine's state of health.

ABOUT MISS DRIVER

(See back cover)

Tall, blonde Lisa Cox is a student at San Gorgonio High School in San Bernardino, California. She likes riding, swimming, and tackle football. Not watching it, playing it. She approves of the new 55 mph speed limit, says going fast is cool on the race track but not on the freeway.

SING ALONG—Cast members sing and dance to one of the musical numbers taken from the production "Godspell' during the Ft. Bragg Christmas Safety Show which ran in December. The show stressed the hazards of holiday driving. (U.S. Army Photo by Sp4 Dallas Riddel)

DRIVER hops on a motorcycling series for the new rider as well as the experienced shoe

GETTING INTO IT

As spring draws near, gas supplies dwindle lower, and prices shoot higher, many people are starting to think motorcycles. And not just those with a bike in winter hibernation that's waiting for the first balmy spring afternoon to stir it to life. An awful lot of people who'd never have considered riding a motorcycle before our present energy situation will be out there dicing with traffic on two wheels this spring.

Well, bikes are fun and very economical transportation, as an ever-increasing throng of motorcycle enthusiasts will attest. But there are some hang-ups with motorcycles—like they *can* be dangerous, especially for the inexperienced rider. Although experts say that motorcycling *should* be a reasonably safe means of transportation, we all realize that it's not all that safe.

While we're not into accident stats —and we're not going to get into them—there is one very important fact that all new riders should be fully aware of. The vast majority of motorcycle accidents involve inexperienced

riders—usually people who've been riding less than six months. This means that if you new riders want to have a "full season" of motorcycling you have to get through those first few months. If you do, the odds for a lifetime of safe riding are greatly in your favor—providing you're a careful and smart rider.

So what's the problem in those first few months? Well one of the big hang-ups is that although it seems like you should be able to just hop on a motorcycle and take off—you can't. A lot of potential riders get munched within a few miles of getting on a bike, proving this point. Riding a motorcycle is a reasonably simple operation, but it's not like riding a bicycle, nor is it like driving a car. It's different. And because it's different you have to learn how to operate a motorcycle properly to ride safely. A motorcycle, like any other vehicle, is precisely as safe as its operator. So it's essential that you get proper riding instruction, either from a dealer, a manufacturer, or at your base to make sure you develop correct riding techniques and habits.

NEW SERIES

To help you "get off the line and into turn one," we're running this basic motorcycling series. These articles are not designed to tell you new riders everything you need to know, but to supplement what you learn from proper riding experience. We hope to get into things in the next few months that will benefit all bikers—even the experienced ones. But for right now, we want to get to you new riders and urge that you get some riding instruction before heading out on your own. You should also get as much no-traffic or low-traffic riding experience as possible before going out to dice with the four-wheel monsters that are always waiting for new prey.

Of course we also have ulterior motives. We think bikes are great . . . when they're ridden correctly and safely. And we'd like to help you become a safe driver to keep you around for a while. Also, in the words of the American Motorcycle Association, we want you to "always put your best

continued

wheel forward" to help improve the motorcyclists' image.

GETTING ACQUAINTED

The very first thing a potential new biker should do is get thoroughly acquainted with the controls of a motorcycle. Most everybody has some idea of where the controls are and what they do. But you should develop a complete understanding of the controls before even considering riding a bike. Figure 1 shows and explains some of the most important cycle parts and controls.

After you know what and where the controls are, get a friend to let you sit on his (or her) bike and work the controls. With the bike on the center stand, practice clutching, accelerating, shifting, and braking as if you were actually riding. Continue this simulated riding until you can work the controls smoothly and automatically in response to potential riding situations. When you can do this, you're ready to take a cautious test ride in a parking lot or vacant field under the supervision of your friend, or go to a "safe-riding" program to try things out.

BUYING A MOTORCYCLE

When you've got the mechanics pretty well figured out, you can start checking into buying a motorcycle. We would recommend that you buy (new or used) from a reputable dealer, unless you have a friend who is really into bikes and can check out a bike being sold by a private owner.

One good thing about purchasing a used motorcycle is that it's hard to get really burned, if you check things carefully; most motorcycle repairs can be completed for a moderate amount of time and/or money.

Next month we'll be getting into a complete motorcycle inspection and the essential bike maintenance. But if you're in the market for a used bike now, there are a few important mechanical and safety items you should check.

CHECK OUT

First, check over the bike generally. The headlight, taillight, and brake

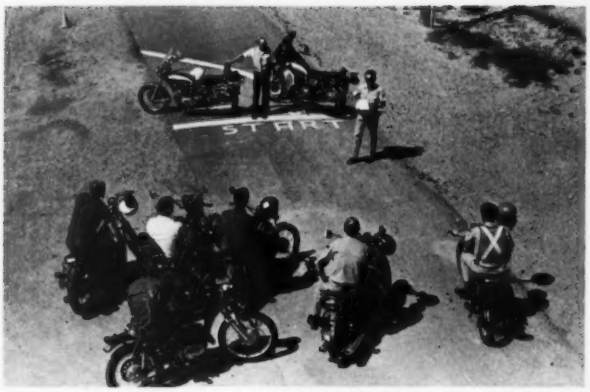
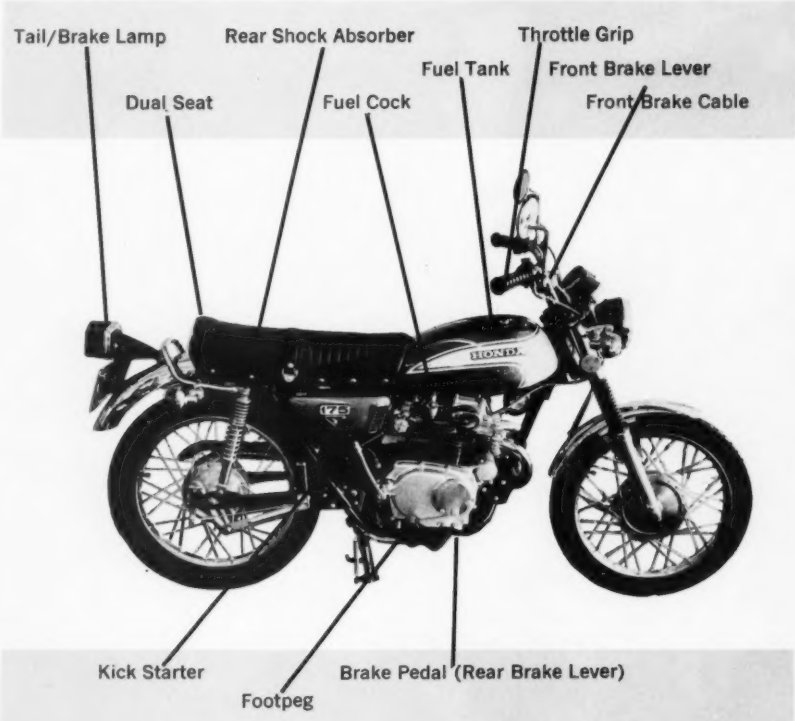


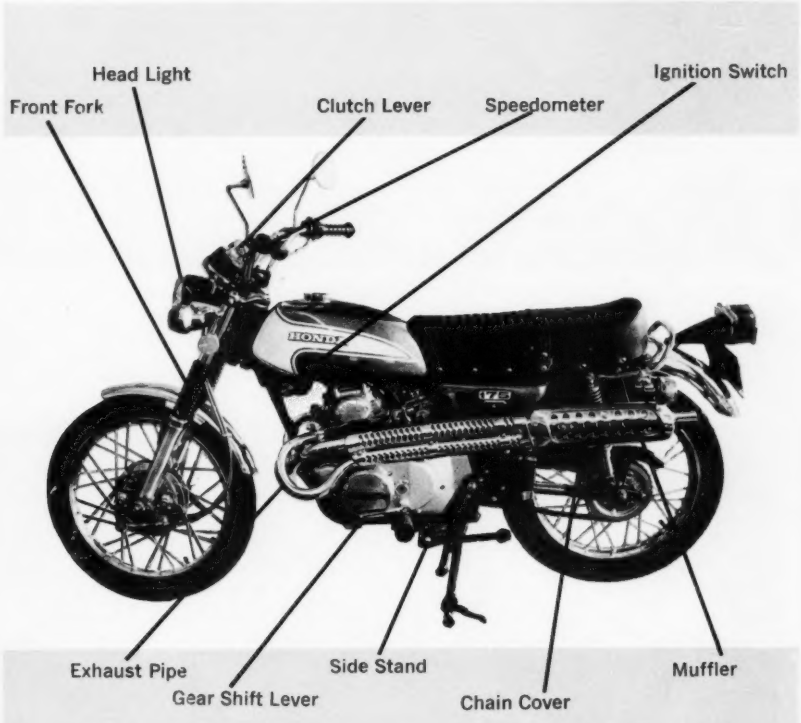
Fig. 1



Typical Motorcycle—Right Hand View

Learning to work the controls of a motorcycle is the first step in getting into motorcycling. The best way to do this is to sit on a friend's bike and practice clutching, shifting, accelerating, and braking—just like you're actually riding.

You can't just hop on a motorcycle and go, as evidenced by the fact that the majority of motorcycle accidents involve people with less than six months riding experience. Attending a safe-riding program and getting plenty of riding experience before battling traffic is the way to go.



Typical Motorcycle—Left Hand View

A reputable authorized dealer shop is the best place to look for a motorcycle—new or used. Along with offering a complete line of bikes, a good shop thoroughly prepares a bike before sending you out the door. They should also back up the bike if you have any problems—especially important with a used bike.

light should work properly. Make sure the muffler is legal and the drive chain is free of kinks and is properly lubed. If the bike looks beat, check the frame carefully for cracks or bends—especially at the welds. Many people buy street-legal bikes, strip them for off-road use, then replace the lights and street equipment when they are ready to sell the bike. So if the machine looks beat, yet the gas tank, headlight, and fenders look surprisingly good, be suspicious.

If the bike appears to be in good general condition, have a look at the tires and brakes. Tires should have plenty of tread and be free of cracks or other damage. The front tire wears on the edges—especially the left edge—during cornering. So don't judge a front tire by the center tread portion—measure the edges for ⅛-inch of tread depth. The rear tire tends to wear in the center, so it's easy to tell when it's shot. Be sure the brake control cables are in good condition and check brake operation by rolling the bike and applying each brake.

Raise the bike on the center stand and spin each wheel to be sure the rims aren't bent and the wheels turn truely. Check for bent or broken spokes. Check the suspension by pushing down on the front and rear of the bike. The rear shocks and front forks should give firm damping and there should not be any fluid leaking from the shocks.

Finally, check the clutch and throttle cables for rusting, fraying, or any sign of damage. Control cables are extremely important since a bad cable can cause a throttle to stick open or a clutch to disengage at very inopportune times—like when you're waiting to pull into traffic.

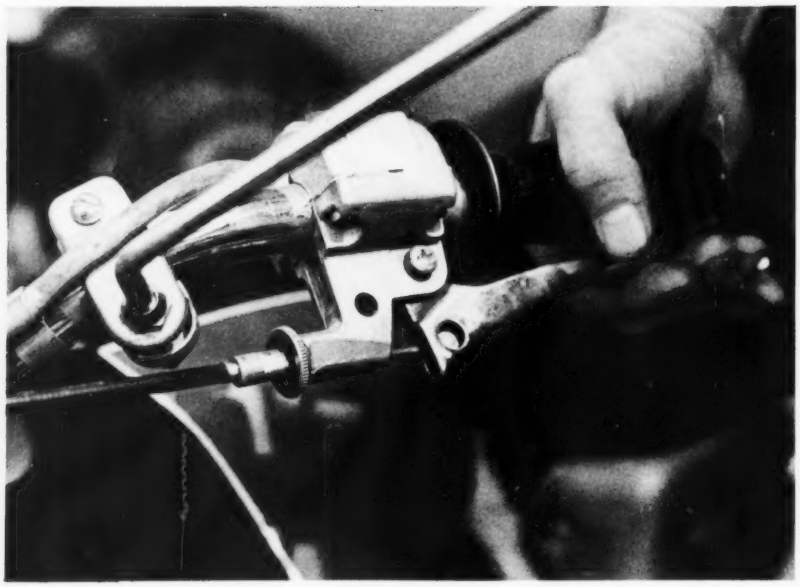
If all of these items check out, the bike should be in reasonably good shape. But be sure to have an experienced rider give the bike a test ride to see that it runs and handles correctly. Of course, if you're not in a hurry you might want to glance at next month's installment before taking the used-bike plunge.

continued

THROTTLE — The throttle, located on the right handle grip, controls a motorcycle's acceleration. Twisting the handle toward you increases engine speed—turning the throttle away decreases engine speed. Most motorcycle throttles are equipped with spring returns that automatically close the throttle when the grip is released.

FRONT BRAKE—The front brake lever is on the right handle with the throttle. The brake is applied by squeezing the brake lever toward the handle grip. The lever controls only the front brake, and does not activate the brake warning light—except on newer bikes. The front brake is by far the most effective brake on a motorcycle. It's very important to have the front brake properly adjusted and get the feel of the braking action. This way you can use the brake automatically and won't be afraid to grab it in an emergency—as are many riders.

Note: The proper riding technique is to use **both** brakes together. The front brake provides most of the stopping power while the rear brake keeps the rider from going on his head.



A few of the essential items to be checked on a used bike are the wheels, brakes, and suspension system. Control cables are another very essential, but frequently overlooked item—they should not be frayed or rusted and should be properly lubed.

KNOW YOUR BIKE

CLUTCH—The clutch lever on most modern motorcycles is located on the left handlebar and is operated by squeezing the lever. Pulling the lever toward the rider disengages the engine from the transmission. Letting the clutch out engages the transmission and relays power to the rear wheel. The clutch is used for changing gears just like the clutch in an automobile.

GEAR SHIFT LEVER—On most bikes, gear shifting is done by means of a foot-operated lever which is located at the footpeg on the right or left side of the engine case. Many contemporary machines have interchangeable shift levers and brake pedals which allow the rider to choose on which side he wants each control located. To shift gears, the lever is either depressed or lifted with the toe—depending on the shift pattern. The shift pattern varies according to the make and model. The owner's manual should be checked for the correct shift pattern and technique on any bike you're unfamiliar with. The shift lever is designed so that it cannot be shifted through more than one gear without first allowing it to return to a horizontal position—eliminating gear skips. One thing to be very careful of is switching from one bike to another without adjusting to the different shift patterns and/or location of the brake and shift levers. Many people have been wasted on an unfamiliar bike when they went for the brake in an emergency and hit the gear shift lever instead.

REAR BRAKE—The rear brake control pedal is located at the footpeg on the side opposite the gear shift lever. It is operated by applying pressure with the foot. The pedal controls only the rear wheel brake.

IGNITION—Most current machines have a key-operated ignition system that may be located in different places on the bike. Generally the ignition is on the frame near the steering head, on the side of the machine under the gas tank, or on the headlight housing. The starting device is usually a foot-operated kick starter that may be located on either side of the bike. It folds in toward the machine when not in use. More and more bikes—especially road bikes—are being equipped with electric starters operated simply by pushing a button. Motorcycles also have a separate gas shut-off valve located under the gas tank. The fuel should always be shut off when the bike is parked.

LIGHT AND HORN—The horn on most machines is controlled by a button on the left handle grip. The light switch is usually located on the headlight housing, handlebar, or sometimes the lights are controlled by the igniton key.

A used bike should be carefully inspected and test ridden by someone who is really into bikes. If the machine has seen a rough life, be sure to check the frame for cracks or bends.

DRUM BRAKES

It's easy to up your stopping power

Brakes are the one part of a car that nearly every driver is concerned about. And its no wonder—losing your brakes would be traumatic at best. Although brake failures are quite rare with today's dual-master cylinder, heavy-duty brake systems, your car's brakes do require some basic care and maintenance to keep you stopping surely and safely.

The most common brake maintenance is checking the brake linings and/or pads for wear and replacing them when they are worn too thin. This is the subject we'll deal with in this *Backyard Mechanic*. Next time we'll pick up with some of the regular checks and service needed to keep your car's brake system doing its thing—like inspecting and bleeding the hydraulic system and checking the self adjusters.

SIMPLE SYSTEM

Because brakes are one hundred per cent essential to driving, many backyard-type mechanics are leary of doing any brake system maintenance. But as we discovered in *The Backyard Mechanic* Part V, May '73 DRIVER, that dealt with disc brake service, brake systems are about as simple as they are essential. While drum brake service can be a bit more involved than disc work, if you study a service manual and work carefully, you can easily and safely do a complete brake job at home with ordinary tools and equipment. In addition, you'll save a nice bundle of cash.

Since most newer cars are equipped with front disc brakes, we'll only be concerned with rear drum brakes here. However, the procedure for relining front drum brakes is basically the same as for rear brakes.* So, if you have drum brakes all the way around, you shouldn't have any problems doing a complete brake job by following the basic procedures given here and in a service manual.

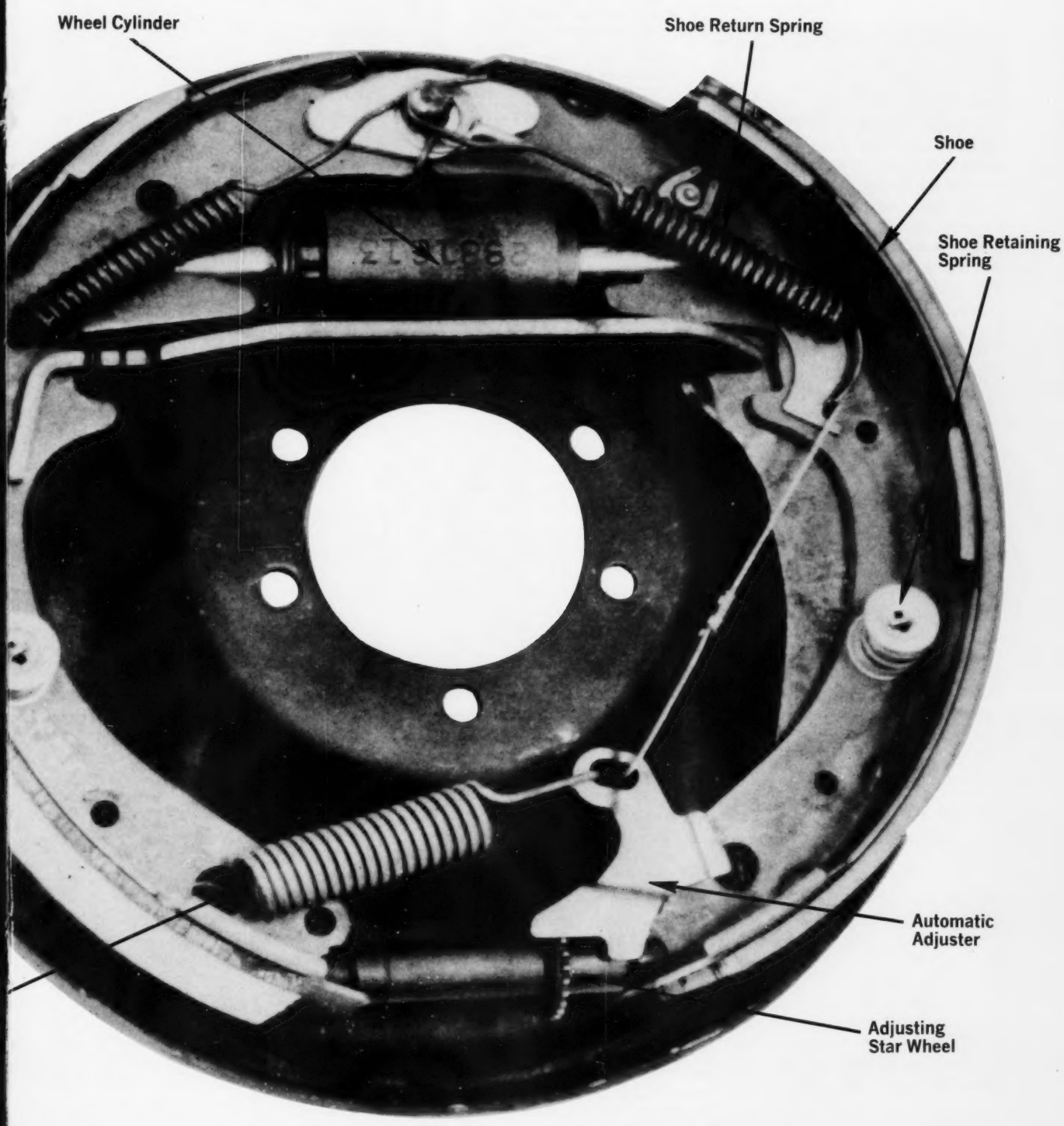
WHEN TO RELINE

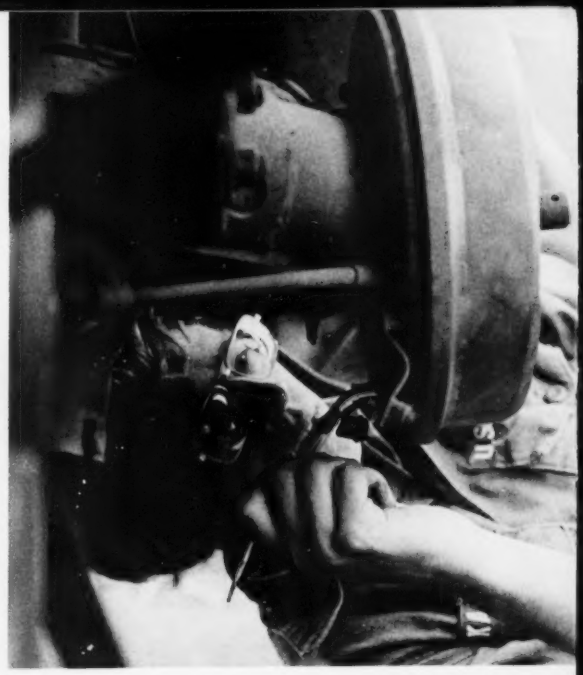
Your car usually lets you know when its brakes need help by not stopping like it should, by giving you less and less brake pedal to work with, and sometimes by issuing noisy warnings when you hit the brakes. But its

continued

* *The only real difference is the way the drums come off. The* Backyard Mechanic, *Jan '74 DRIVER, covers front drum removal and repacking of front wheel bearings—a job you'll want to do when you reline the brakes.*

TYPICAL DRUM BRAKE





The brake adjustment often has to be backed off to remove each drum. Locate the access slot (usually on the backing plate behind the brake assembly). While holding the self-adjuster lever away from the star wheel as shown in the diagram, turn the wheel with a brake adjusting spoon or screwdriver until the brake is completely backed off. Make sure the emergency brake is released when you loosen the brakes.

not a very safe nor economical idea to wait until the brakes are this far gone to replace the linings. In most cases, letting the linings wear extra-thin causes damage to the brake drum which could have been avoided or made less costly by timely replacement of the linings.

The best and only certain way to be sure of the condition of drum brakes is to regularly pull the drums and check the linings for thickness. The brake shoes should be replaced when the linings get down to less than ⅛-inch above the metal on bonded linings, or above the rivets and riveted shoes. If the linings are soaked with brake fluid you should also replace the shoes in addition to fixing the fluid leak.

It's usually recommended that brakes—both front and rear—be inspected at least every 10,000 miles. But rear brakes *normally* wear about twice as long as front brakes, and pulling the rear drums can be a hassle. So, if you know when the rear brakes were last relined or checked, you can get by with checking them every other time you inspect the front brakes. However, a faulty automatic adjuster, among other things, can cause the rear linings to go fast and put a dangerous strain on the front binders. So don't hesitate to pull the rear drums at the first sign of any brake problems.

GETTING READY

Because pulling the rear drums can be a hassle you should be prepared to go ahead and do a complete brake job—if necessary—when you pull the drums. But since there's no way to tell exactly what parts and/or service are required (if any) before you pull the drums, the best bet is to check to be sure the local shop has parts for your car before you begin. You'll also need some transportation to get you to the shop to pick up any needed parts since you can't very well drive your car without the rear drums.

To finish your preparation, locate a machine shop that offers while-you-wait service in case you need to have the brake drums machined. Many base auto hobby shops have the special lathes and equipment needed for doing brake machine work. So, if you're not working at the hobby shop, you may be able to save some bread by having machine work done there.

When you've checked out the local parts house and machine shop you're set to begin. If you've got your tools and a clean surface to lay out parts on, all you need are some clean rags and denatured alcohol. You should also have some paper and pencil to make any sketches of the brake assembly needed to supplement the diagrams in your service manual. Some smart camera enthusiasts find a black and white Polaroid is the easiest way to make a foolproof record of how the assembled brake should look.

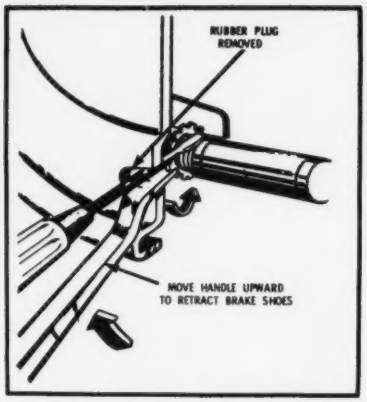
When you've got everything organized, chock the front wheels to keep the car from rolling and carefully raise the car's rear end just enough to get the wheels off the ground. Place safety stands securely under the car's frame. Remove both rear wheels and release the emergency brake. Finally, place a block of wood under the brake pedal to prevent accidentally depressing the pedal—something which can cause real problems when the brakes are disassembled.

REMOVING THE DRUMS

When you're ready to get into things, the first step is removing the brake drums. The same type drum brakes have been used on all American cars except Vega since 1970, and on most cars since 1966, so the procedure is basically the same for newer cars. Generally all that's required is backing off on the brake adjustment so the drums can be pulled free. To do this, first remove the rubber plugs that cover the brake access slots—usually located on the backing plate behind the brake assembly. Some cars may have a filled access slot that will have to be punched out to gain access to the adjuster.

Insert a brake adjusting tool (costs about 50 cents) or screwdriver in the slot. Then, while holding the automatic adjuster lever away from the star wheel with a small screwdriver, turn the adjuster up until the drum turns freely (see diagram). Give the adjuster four or five good turns to make sure the brakes are completely backed off.

If the drum won't budge after loosening the brakes, you may have to use a wheel puller. Check your



Brakes are adjusted by using brake spoon or screwdriver to turn star wheel on adjuster screw. Job is faster if self-adjusting lever is released as shown.

manual for the specs on your car. If a wheel puller is needed, you should be able to rent or borrow one from the parts house where you are getting your parts.

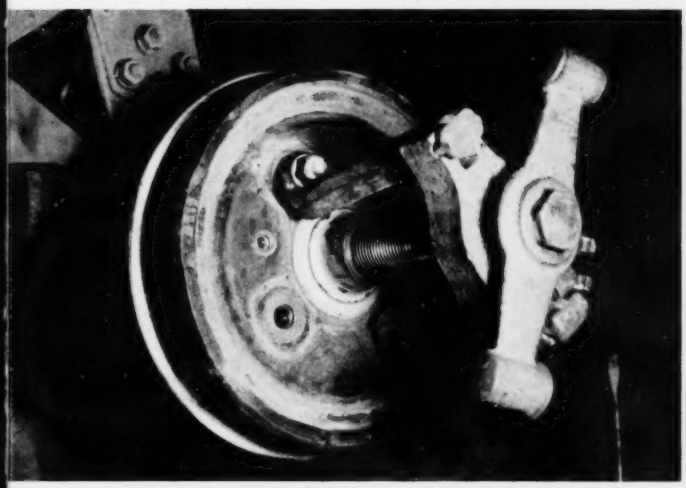
After removing both drums, immediately check the linings and drums for wear. If the linings are worn past ⅛-inch, they should definitely be replaced. If there is plenty of lining, rough up the lining with fine sandpaper and clean the assembly with alcohol before reinstalling the drum. If replacement linings are needed, the best bet is to stick with good-quality, asbestos-bonded brake shoes. While relined shoes are a little cheaper, your brakes are only as good as the linings. So the small amount saved on cheaper linings isn't worth your safety.

MACHINE WORK

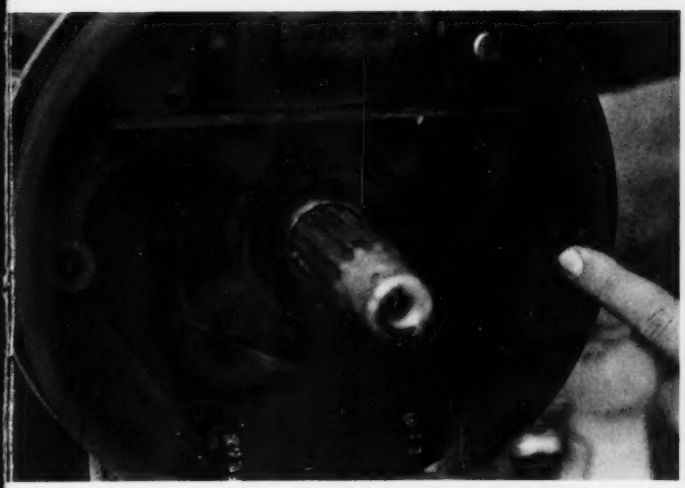
The brake drums should be cleaned and checked for warping and heat discoloration. If the inside surface of the drums have grooves or scratches large enough to catch a fingernail, the drums should be "turned." Turning is

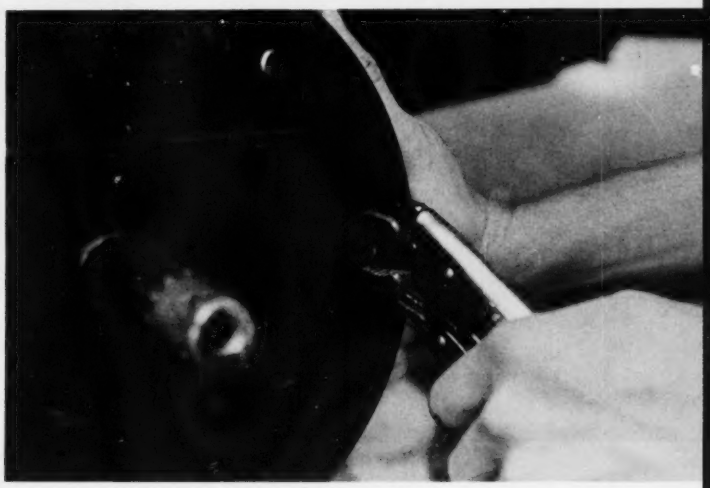
continued

The drum should slide off with the brakes released. However, on some cars a wheel puller may be required. Check your manual for the correct drum removal procedure using a wheel puller. Basically, you simply attach the puller to the drum (or lugs on some cars) and tighten the puller to release the drum.



Clean the removed drums with denatured alcohol and check the inner surfaces for wear. The drums should be relatively smooth—scratches large enough to catch a fingernail mean the drums should be taken to a shop to be turned. If the drums are warped or badly heat discolored, they should be replaced.





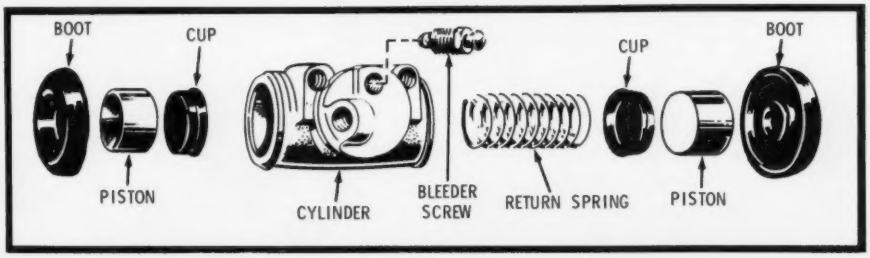
Check the brake linings for wear. The shoes must have at least ⅛-inch of linings remaining above the metal or rivets to warrant leaving them in. If the linings are worn, begin removing them by using vise grips to release the retaining cap from the brake shoe retaining pins.

simply machining the inside of the drums to a smooth surface. However, since grinding the drums down until there is less than .60-inch of drum thickness is a very dangerous practice, most drums can be turned only once, or twice at the most. If the drums have a sharp edge at the back of the braking surface, the drum has been turned at least once—have the machine shop measure the drum carefully before turning it again. Most shops will give you a trade-in for your old drums if you need new ones.

If the brake drums need turning, be sure to have the new brake shoes arced. Arcing the linings is simply machining them so they fit the drum more closely. This eliminates the normal lining wear-in period. However, arcing is not necessary unless the drums are turned.

Using a special brake spring tool, carefully remove the primary and secondary return springs from the shoes. If you do not have the special spring tool, you can use vise grips to pop the springs off. But use extreme caution with either tool because the springs can pop loose at dangerously high velocities. Check the springs for wear and damage and place them in an appropriate container. If you've had problems with dragging or noisy brakes you might consider replacing these springs—especially if they are worn, corroded, or weak.

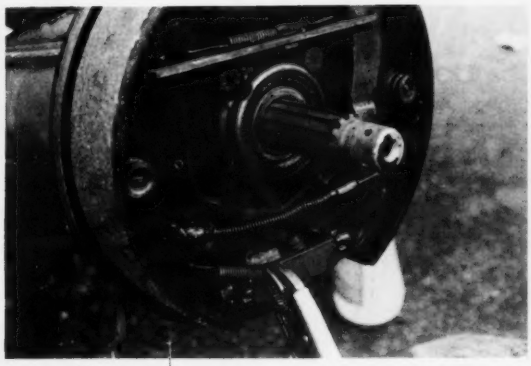
After removing the springs, carefully release the self-adjuster unit following the instructions in your manual. Next, release the parking brake cable and remove the old shoes. Disconnect the parking brake lever from the removed shoe so it can be installed on the new shoe. Screw out the star wheel adjuster assembly and apply grease or spray lubricant to the threads and reinstall it.



The wheel cylinders are critical since they expand the brake shoes to operate the brake. Check the cylinders for leaks by pulling back on the rubber cap. Any fluid inside the cylinder means the unit will have to be rebuilt or replaced. The cylinder can be rebuilt by simply installing the new parts included in a rebuilt kit. Easy-to-follow instructions come with the kit. However, wheel cylinders can only be rebuilt if the bores are in good condition. Light scratches can be cleaned with crocus cloth and a rag soaked with clean brake fluid. But deep gouges call for a new cylinder.

If the wheel cylinder is rebuilt or replaced, you will need to bleed the brake system to remove any air that entered when the cylinder was opened. This will be covered next month.

If the wheel cylinder is not **leaking,** or after it is rebuilt, tie cord around the cylinder pistons to prevent them from popping off accidentally and leaking in air. Then use a small broom and an alcohol-soaked rag to thoroughly clean the brake assembly.



After cleaning the assembly and drum with alcohol, install the new brake shoes just as the old ones came out. Be sure to hook up the self-adjuster and parking brake cable properly. Make sure there isn't any brake fluid or oil on the new linings or drum, and double check the assembly with the diagrams in the service manual and the fully assembled brake. If everything is okay, expand the brake shoes by turning the adjuster wheel until the drum will just fit over the linings. You may have to centralize the shoes by hand to get the drum on. The shoes tend to move out of place without the drum to hold them.

Finally, when you pick up the new brake shoes, be sure to grab a couple of wheel cylinder repair kits. You may not need to rebuild the wheel cylinders, but you might as well have the kits handy just in case (this will be discussed later). The shop should also be glad to take back the kits if you don't use them.

When you've picked up the new brake shoes and had the drums turned (if necessary) you can finish the brake job in a matter of an hour or so. The rest of the job is a mechanical process as illustrated in the accompanying pictures. Just work carefully and slowly, following the procedures recommended in your manual. Be sure to work on one wheel at a time so you can use the properly assembled brake as a quick reference.

When everything is back together you can repeat the process on the other wheel.

With both wheels completed, have a buddy operate the brake pedal while you spin both drums by hand to be sure the brakes work. If they both check out, you can button everything up and go for a cautious test drive.

If there aren't any unusual noises and the braking action is good—you're all set. Go easy on the new linings for the first couple hundred miles to give them a chance to wear in—especially if they haven't been arced. You'll also need to adjust the brakes several times as they wear in.

The self adjusters should take care of the adjustments in the normal fashion—when you drive in reverse and apply the brakes. However, you may need to bring the adjustment up manually at first so the self adjusters can take over. To do this, simply use a brake adjusting spoon or screwdriver as you did before. Turn the adjusting star wheel (parking brake off) until the brake tightens up all the way. Then back off the adjustment until the wheel turns freely. Be sure to back off both brakes the same amount to equalize them.

It's always that OTHER guy. He's the one causing all the wrecks, crashes, spinouts, and rollovers.

Well, isn't he? Haven't we been lectured to about the "other guy" until our ears hurt? Don't all publications that encourage good driving constantly warn us about that elusive "other guy" who's lurking out there somewhere, just waiting for his chance to do in all of us perfectly innocent good drivers?

Well, should you WATCH OUT for the "other guy," or watch out FOR him? When you pull out into traffic, do you look out FOR him? Do you really give him enough room and time so he doesn't have to change his speed, his direction, or his mind? Does your car blend smoothly into the traffic flow, and can you state that you don't prompt any angry gestures or words from other drivers? Or do you "roll" stop signs and lights, scaring the wits out of approaching motorists? Are your lane changes kinda sloppy? Do you tend to party and drink a little too much, stay out a little too late—then try to drive back to the base in a slightly polluted condition?

Is someone else out there really the "other guy," or are we all that dreaded individual?

Well, DRIVER has a way to identify those "other guys"—dangerous, devious, foolhardy, arrogant, careless fellows (or gals) that they are—and we're going to let you in on our secret. Maybe you'll be selected for our special team to stamp them out.

We'll have about 3 zillion big rubber stamps made up, each 3 feet long and a foot high. We'll send one to each good guy on our special Other Guy Identification Team (OGIT), and then the "other guy" had better watch out.

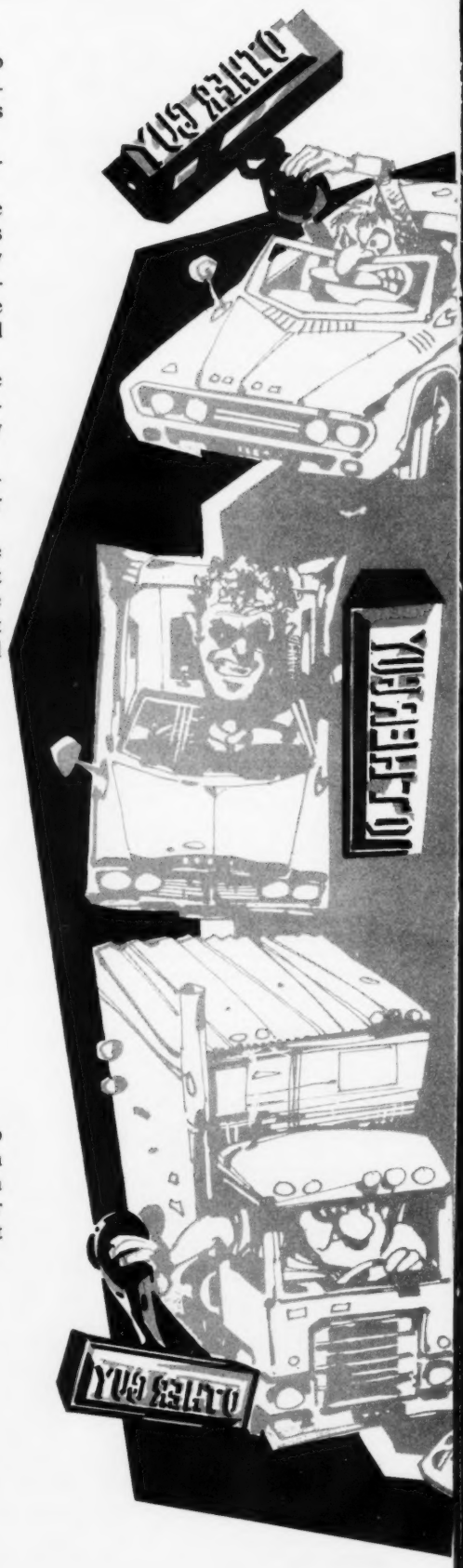
Here's how the plan will work. When pressed into our special orange ink, and then whammed against a car door or trunk, each stamp leaves an imprint that says "OTHER GUY." (We have a special stamp for bike tanks.) Whenever one of the bad guys is spotted, he'll be followed and marked by an OGIT member. The paint won't come off for at least 6 months, and it will glow at night as well as during the day. For repeat violators and those who do especially dumb things, OGIT men have been instructed to use the stamp at least 17 times on the front, sides, and top.

We hope to accomplish the following useful objectives:

- We will at last be able to tell the good guys from the bad guys (shouldn't take more than a few months at most). The special markings will allow us to avoid these dreaded menaces to life, limb, and sanity.
- Most bad drivers whose cars are stamped will get the message and improve their driving habits, lest they get whammed again.
- If nothing else, we'll get everybody wondering just who that "other guy" is.

Okay, guys, who's going to be the first *not* to get whammed? Watch out for the mad OGIT stampers; they're out to get that "other guy." Aren't you glad they won't get you? Or will they?

Editor's note: You guys and gals do realize we've been putting you on a bit, don't you? While this idea was a good one, we've learned that rubber stamps of the size required just aren't available.



Who's that "other guy" we are always talking about?
IT'S NEVER
EMI
KELLEHER

BACKFIRE

EASIER WHEEL CHANGING

I'd like to pass on a tip which I have found very effective and which minimizes frustration when it comes to changing wheels.

Whenever I purchase a new car I buy a new lug wrench of the type shaped like a large plus sign (+). I then paint the section that fits my wheel lugs to avoid having to search for the proper size section whenever it is necessary to change a flat.

Believe me, when you're in a hurry this gimmick saves a lot of *#&, etc.

Charles A. Wahler (USAF Ret)
Asst. Chief, Operations Div.
APO New York 09666

ON LOCKING THE CAR DOOR

Congratulations on editing a real fine magazine, which I am sure has helped reduce our POV and GOV accident rate considerably.

However, one part of the statement made by Miss DRIVER in your December '73 issue is dangerously wrong. She states that, ". . . The door on his side flew open but his seat belt held him in the car . . . but had he locked his door, he probably wouldn't have suffered the painful injuries . . ."

As far as I know locking any car door (pushing the button down from the inside) only prevents it from being opened from the outside. It doesn't prevent it from "flying open" any more than if the button hadn't been pushed down. While locking the door may be a good idea in stop-and-go traffic in certain neighborhoods, it could prevent a rescue team from opening the door from the outside after a serious accident. Locking doors while driving could have tragic results.

Capt. Christian T. Treutler, USAF
Commander, 36th Transportation Sq
APO New York 09132

With most cars built during the last six years, "pushing down the button" engages a true locking device and does do more than keep the door from being opened from the outside.

So far as preventing a rescue team from gaining access; if the accident is that serious and the doors are still closed, forcible entry may well be necessary anyway because of damage to the car body.

This is like the old seat belt argument. There are times when it might really be better to be unbelted so as to be thrown from the car, but the odds are heavily against it. So far as we know, there is no expert who advises against locking the car doors while driving, and a great many who do.

ENGINE WASHING

I often see people at the car wash raise their hood and spray their car's motor. What is the wisdom of this procedure? Does it do any damage?

We all enjoy your magazine very much.

TSgt Frank S. Allison
HQ AFCD (LGGCYD)
Kelly AFB, Texas 78243

Engine washing is generally an acceptable procedure, if a few precautions are taken.

First, it's best to use a high-pressure spray of warm water, such as at a commercial car wash. Using a garden hose and cold water would be ineffective in removing the gunk, plus could damage a hot engine.

Before washing, it's a good idea to cover the distributor cap and spark plug wires with plastic wrap to avoid soaking them. To avoid shorts it's best to ensure there are no cracks in the spark plug wires.

Should the engine fail to start after washing it's probably because water has collected under the distributor cap. In this situation, remove the cap, wipe out the inside, replace the cap, and try again. The engine may run rough after it starts, but will soon smooth out after everything is thoroughly dry.

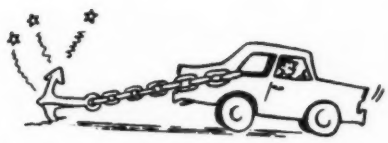
PRICING NEW CARS

I enjoyed reading the Double Clutch column entitled, "Do Window Stickers Scare You," appearing in the January '74 DRIVER. It is amazing how many new car buyers are unaware that dealer cost information is readily available to them on any new, and some used, cars. Without this information, as your article points out, a buyer is often likely to pay an excessive amount for the car of his choice.

I bought a new car at $135 over the dealer's cost, but it was only be-

☆U.S. GOVERNMENT PRINTING OFFICE: 1974—789-872/7

LETTERS TO THE EDITOR



cause I had this information and could shop around until I found a dealer willing to accept what I considered a reasonable profit.

Your readers might like to know that most book stalls carry books on new car prices that give this information, yet cost only $1.50. This is considerably less than the $7.50 fee you mentioned to obtain computerized data, and, of course, there's no delay.

Lt Col M. D. Wasemiller
63rd MAW/DOXC
Norton AFB, CA 92409

BACKYARD MECHANIC REPRINTS

I was quite impressed with the November DRIVER, the first issue I have seen. I particularly enjoyed the articles on winter driving and the "Backyard Mechanic." Are reprints of the first ten "Backyard Mechanic" articles available?

Maj Patrick Lawrence, USA, MC
Cardiology Dept
Fitzsimmons Army Medical Ctr
Denver, Colorado 80240

"The Backyard Mechanic" has been a very popular feature of DRIVER, thanks to Bob Kays, our Technical Editor. But unfortunately we no longer have extra copies of each issue in the series. We are sending you what's still available.

(As a result of numerous requests for back issues in this series, we are attempting to arrange for black and white reprints of this series. Watch DRIVER for announcement of their availability.)

BETTER STOPS ON ICY PAVEMENT

Yesterday I lost control of my car while driving on an icy street. I was trying to stop for a traffic signal while traveling about 5 miles an hour.

As a result of this experience I did a little experimenting, and believe I have a good suggestion to pass on to all drivers.

My experimenting (on an empty K Mart parking lot) revealed that my car is impossible to stop on icy pavement with the transmission in "Drive," without sliding any wheels. At speeds under approximately ten miles an hour the front wheels start sliding as the rear wheels push the car forward. Needless to say, a car with its front wheels sliding, or with all four sliding, is out of control.

Here's what causes the problem. (1) Almost all late model cars have higher idle speeds due to the emission control systems. (2) Extremely cold weather causes the automatic choke to remain on longer, resulting in even faster engine idle. (3) These cars also have brake proportioning valves which cause the front wheel brakes to apply "harder" than the rear ones (a fine situation in most driving situations).

My solution for this problem is to shift the automatic transmission to neutral as the speed drops below 10 miles an hour, when driving on icy pavement. This enables me to stop without sliding and losing control.

Other winter drivers can determine the speed at which they should shift to neutral by the following method. Select a level, deserted piece of pavement, put the automatic transmission in "L" and let the car "creep" until it reaches a steady speed.

Now remembering that we are discussing *stopping* the car, everyone will agree that for their own personal speed "X" the drive train is opposing the stop at any speed less than "X". Therefore, you have just found your own speed at which to shift to neutral when stopping on ice.

Maj Samuel E. Cook
Box 5386
Ft. Worth, Texas 76108

CAR THEFTS

As a proud member of the Air Force, I have been rather pleased with the information printed in DRIVER magazine, particularly about preventing auto theft. If more people would take just 20 per cent of the precautions mentioned, I guarantee there would be a decline in auto thefts.

Most people feel that it won't happen to them, but that's the wrong attitude. It's much better to be prepared by taking all the precautions so the clock will run out on the thief before he has a chance to score the big one.

I feel this magazine has really helped me learn what to do and what not to do when it comes to cars. Please keep the important car news coming.

Airman Paul A. Williams
Box 1624 PSC #2
Sheppard AFB, Texas 76311

Thanks, Paul. Comments such as yours make our efforts doubly worthwhile.

Address your letters to:
Editor
DRIVER Magazine
AFISC/SEDD
Norton AFB CA 92409

"On race day, I like to groove around in my old cut-offs and keep cool. But before I get on, I put it all on. I can't believe how some people fuss about their helmets and then ignore other protective gear. My helmet is the most important thing I own, but I also know that leathers can save plenty of skin and even broken bones."
miss driver
LISA COX